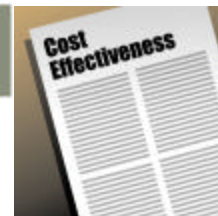




The Lower Snake River Juvenile Salmon
Migration Feasibility Report/
Environmental Impact Statement



Cost Effectiveness

Information on cost effectiveness

The U.S. Army Corps of Engineers (Corps) continues to study ways to improve juvenile salmon passage through the hydropower system on the Snake River. As part of this effort the Corps released the Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement (FR/EIS) in December 1999. These information sheets discuss specific topics covered in the FR/EIS. The entire FR/EIS can be found on line at <http://www.nwww.usace.army.mil>. For more information contact Dave Dankel, Walla Walla District Corps, at (509) 527-7288, dave.a.dankel@nwww01.usace.army.mil.

The Drawdown Regional Economic Workgroup (DREW) was established to aid in the development of a comprehensive social and economic analysis (which includes Cost Effectiveness) for this Feasibility Study. The DREW includes economists from Federal agencies, the Northwest Power Planning Council, states, tribes, contractors, and other regional stakeholders. The DREW analyses on any given subject presented with these sheets should be seen as only part of the overall economic analysis and should always be viewed in the context of the larger economic analysis as presented in Appendix I of the Draft FR/EIS.

Purpose of the Cost Effectiveness Analysis

The Cost Effectiveness workgroup, a DREW subgroup, has completed an analysis and a draft report that formed the basis for Section 9 of *Technical Appendix I—Economics* of the FR/EIS. The purpose of the cost effectiveness analysis is to identify the least cost alternative for providing various levels of output. For example, if two of the alternatives under consideration meet the National Marine Fisheries Service (NMFS) survival and recovery standards, then cost effectiveness analysis helps to establish the less costly alternative. It should be noted that this report only deals with National Economic Development (NED) costs and benefits. The NED account displays changes in the economic value of the national output of goods and services. The analysis does not consider the Regional Economic Development (RED) account, which addresses changes in the distribution of regional economic activity. It is also important to note that this analysis is subject to review and revision, based on comments received from the Independent Economic Analysis Board and the public. The cost effectiveness analysis is complementary to the benefit cost summary (see Benefit Cost Summary Information Sheet and Section 10 of *Technical Appendix I—Economics*).

How the Analysis Was Conducted

For this analysis, the first step was to consider the probability that each alternative would meet the survival and recovery standards established by the NMFS for the listed stocks at the 24-year survival, 48-year recovery, and 100-year survival benchmarks. Improvements in the number of fish were considered to be the biological output, or biological benefits. Plan for Analyzing and Testing Hypotheses (PATH) data from 1998 formed the basis for this biological output evaluation. The next step was to consider the net costs for the alternatives. Net NED costs are defined to equal implementation costs for the alternatives plus avoided costs resulting from reduced operations and maintenance costs for the dams, etc., plus overall NED costs less overall NED benefits resulting from the alternatives. The final step was a cost effectiveness assessment, which considers the cost to attain an additional percentage of the NMFS survival and recovery standards and considers the cost per additional fish.



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Summary of Results

The results of this analysis are reported in terms of biological considerations and the cost effectiveness comparison.

Biological Considerations

None of the alternatives meets all of the survival and recovery standards using 1998 PATH model results. Alternative 4, Dam Breaching, comes the closest, meeting all of the standards except the 48-year recovery standard for fall chinook. PATH is continuing to refine the model, using new information on key variables related to delayed mortality (the D factor), ocean conditions, and ocean harvests, among other variables.

These modifications are having an effect on model results for fall chinook. Under 1999 PATH results, all alternatives meet the 24- and 100-year survival standards, all dam breaching actions meet the 48-year recovery standards, and dam retention alternatives meet the 48-year recovery standard but are not considered as robust to the current level of uncertainty in relative survival of transported fish as dam breaching. Unfortunately, these 1999 model results were reported too late to be included in *Technical Appendix I—Economics*.

Cost Effectiveness Comparison

The cost effectiveness comparison is summarized here for spring/summer chinook, fall chinook, and all fish. (Data were not available for steelhead or sockeye.) It is important to note that these cost effectiveness comparisons may overstate the benefits of dam breaching relative to dam retention alternatives because they are based on 1998 PATH model results.

Spring/Summer Chinook

There is little difference between the dam retention alternatives and the dam breaching alternative with respect to meeting the NMFS survival and recovery standards for spring/summer chinook. As a result, dam breaching creates little additional biological output using 1998 model results but is significantly more costly. The additional cost of choosing Alternative 4, Dam Breaching, as opposed to Alternative 1, Existing Conditions,

is estimated at \$17,000 to \$35,000 per fish, depending on the year under consideration (e.g., the cost decreases as the number of years increases).

Fall Chinook

Under the 1998 model results, the dam retention alternatives meet the 24-year and 100-year survival standards but are not close to meeting the 48-year recovery standard. The additional cost of choosing Alternative 4, Dam Breaching, as opposed to Alternative 1, Existing Conditions, is estimated at \$20,000 to \$29,000 per fish, depending on the year under consideration.

Costs Applied to All Fish

Alternatives 2 and 3 are estimated to generate more fish than Alternative 1 at a reduced cost. The savings from choosing Alternative 2 is estimated to range between \$11,000 and \$18,000 per fish, depending upon the number of years under consideration. The savings from choosing Alternative 3 is estimated to range between \$3,000 and \$4,000 per fish, depending upon the number of years under consideration. The additional cost of choosing Alternative 4, Dam Breaching, is estimated to be between \$8,000 and \$15,000 per fish, depending upon the number of years under consideration.

Implications of the 1999 PATH Model Results

The 1999 model results have qualitative implications. The biological output will change because the number of fish associated with dam retention alternatives will increase and the difference in the number of fish, between alternatives will decrease. The estimated NED benefits from commercial and recreational fishing associated with the dam breaching alternative as compared with the dam retention alternatives will decrease because the incremental fish output is smaller between alternatives with the 1999 model results.

Although the 1999 model results are not available in a similar format as those prepared in 1998, the biological benefits of the dam retention alternatives improve markedly while the biological benefits of the dam breaching alternative do not change markedly. This new information suggests that all of the NMFS survival and recovery standards can be met under dam retention alternatives at much lower cost than under dam breaching.

